

### Economic Costs Associated with Preterm Birth (PTB), Low Birth Weight (LBW) Infants and Infant Mortality

This section provides an overview of some of the costs associated with infant mortality. In addition to the human costs of infant mortality, there are significant financial costs associated with preterm birth, low birth weight infants and with infant mortality. We examine critical trends reflected in governmental reports and the peer-reviewed literature and report specific data for Maryland. However, this section is not intended to be a thorough examination of these issues, and the extent to which preventing low birth weight, preterm delivery and infant mortality can reduce costs. A full review of economic costs and specific analyses to determine cost saving measures would be an appropriate next step.

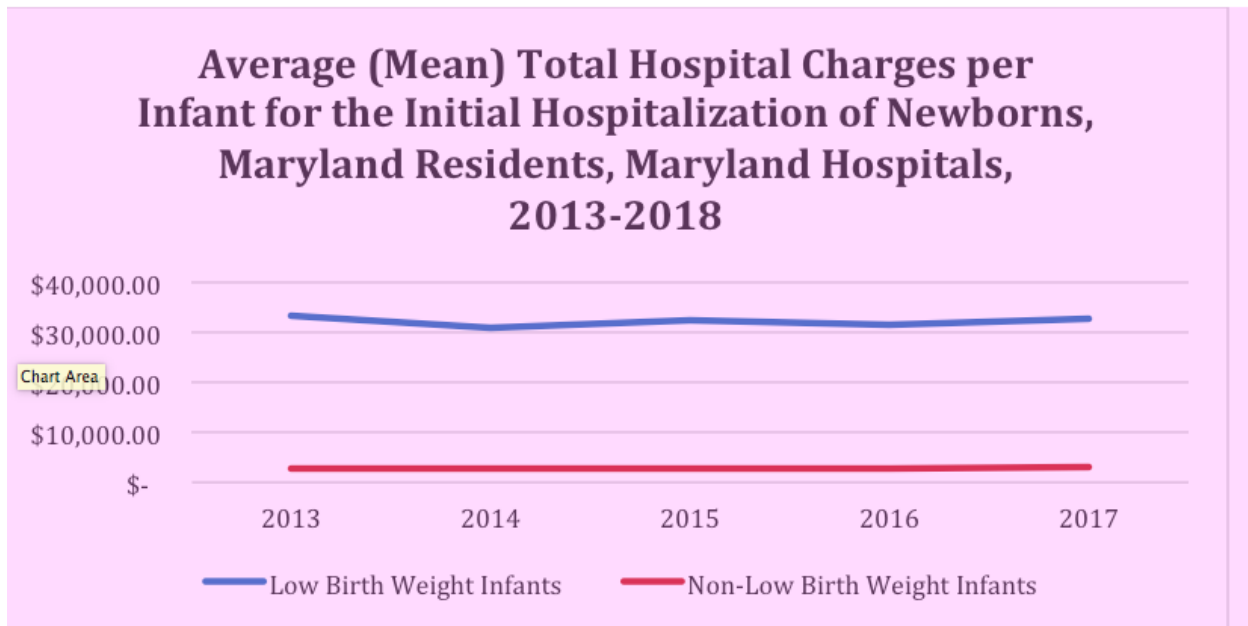
One notable approach to measuring economic costs associated with PTB, LBW infants and infant mortality is to focus on hospitalization costs at birth, examining differences by birth weight. Table 1 contains the mean, median, lower quartile, and upper quartile total hospital costs for the initial hospitalization of newborns who are Maryland residents born at Maryland hospitals. Clearly, LBW infants account for significantly higher hospitalization costs.

**Table 1.** Total Hospital Charges for the Initial Hospitalization of Newborns, MD residents, MD hospitals, 2013-2018

Year	Low Birth Weight Infants				Non-Low Birth Weight Infants			
	Mean	Median	Lower Quartile	Upper Quartile	Mean	Median	Lower Quartile	Upper Quartile
2013	\$33,413.32	\$11,353.02	\$2,337.89	\$33,194.62	\$2,690.12	\$1,658.17	\$1,287.30	\$2,249.15
2014	\$30,925.83	\$10,439.50	\$2,396.96	\$30,863.34	\$2,679.15	\$1,749.28	\$1,319.59	\$2,422.43
2015	\$32,648.49	\$9,665.27	\$2,425.41	\$33,654.39	\$2,834.50	\$1,880.86	\$1,395.33	\$2,583.92
2016	\$31,594.53	\$9,542.33	\$2,363.65	\$32,702.03	\$2,748.79	\$1,821.34	\$1,389.49	\$2,576.53
2017	\$32,877.54	\$8,466.97	\$2,476.56	\$32,510.29	\$2,960.31	\$1,873.89	\$1,391.38	\$2,666.62

In **Figure 1**, there is a significant and consistent difference in average hospitalization charges per infant for Maryland residents born in MD hospitals, with low birth weight infants incurring significantly higher costs. Although hospitalization costs are only one economic cost, Marylanders, as families and health

care organizations, encounter the high medical costs of initial care for vulnerable low birth weight infants.



**Figure 1.** Average Total Hospital Charges per Infant for initial Hospitalization of Newborns, MD Residents, MD Hospitals, 2013-2018

Multiple reports consider additional costs beyond initial hospitalization. A much earlier study by the Institute of Medicine (2007) estimated the annual cost of PTB at that time at \$26 billion, including direct medical care, maternal care, early intervention services, special education and lost productivity.<sup>1</sup> In their review of preterm birth, Frey and Klebanoff (2016) define the economic costs of preterm birth beyond the initial medical costs and include immediate out of pocket costs such as childcare for other children and transportation, loss of family income when one parent leaves full time employment as a result of the PTB, early interventions and multiple services needed across the child's life.<sup>2</sup> In a study of preterm birth in Hamilton County, Ohio, Hall and Greenberg (2016) identified the initial hospitalization costs of 1,444 PTB at \$93 million in 2012, and that although PTB constituted 13.2% of all births, they accounted for 74% of all initial hospitalization costs of all births.<sup>3</sup> Furthermore, they estimated that delaying each PTB by one week could save an estimated \$25 million in those initial costs. To consider long-term community impact, they extended their analyses to examine estimated societal costs of PTB to include fewer college degrees and lost wages of adults born preterm.

It can be helpful to put the economic costs of PTB in a broader context. Petrou and colleagues (2018) conducted a systematic review of studies on economic consequences of PTB.<sup>4</sup> They found that the ongoing economic costs of early preterm births exceeded the annual costs of childhood asthma,

juvenile idiopathic arthritis, depression, separation anxiety, and attention deficit hyperactivity disorder. They also identified numerous gaps in data on the multiple costs of preterm births beyond standard measures of initial hospitalization costs.

There is a clear consensus that the costs of preterm birth and low birth weight infants, key factors associated with infant mortality, are devastating to families and society. Therefore, it is critically important to examine strategies for reducing those economic and human costs.

### *Data on cost effectiveness of preventive measures to reduce preterm birth, low birth weight and infant mortality*

Preventing preterm birth, low birth weight and infant mortality, and reducing disparities in these outcomes, will require consideration of appropriate program initiatives and associated, sustainable funding streams. For example, the role of Medicaid, particularly with African American women, is critical in ensuring they have adequate care. In their 2018 article, Bhatt and Beck-Sagué reported an analysis of infant mortality rates in states that had expanded Medicaid as a result of the Affordable Care Act and those that had chosen not to expand.<sup>5</sup> Of importance to Maryland is that there was a greater decline in overall infant mortality rates in expansion states but in particular, there was a significant improvement for African American infants with the decline in IMR for African American babies twice that of non-expansion states. Although it was beyond the scope of their study to determine the specific elements that affected the IMR, increased access to prenatal and maternal care, the availability of essential services that addressed other health needs, and re-definition of eligibility could all be factors.

In 2018, the Association of Maternal and Child Health Programs published an issue brief, *The Power of Prevention for Mothers and Children: Cost Effectiveness of Maternal and Child Health Interventions*, in which they reported on several states that examined the economic impact of prevention activities such as Medicaid enhanced prenatal care programs.<sup>6</sup> These programs typically included risk assessment, care coordination, health education, and other services specific to participant need. In Washington state, their Public Policy Institute estimated that for every \$1 invested, the estimated savings was \$15.42.<sup>7</sup> In Michigan, every \$1 spent on their prenatal care program yields \$1.38 in savings on preterm birth in just the first month of a newborn's life.<sup>8</sup> A study by Crockett et al in 2017 was the first to examine the newborn intensive care unit (NICU) cost savings from the group prenatal care program, Centering Pregnancy, to payers when a managed care organization provided enhanced reimbursement to doctors to defray the costs and reward providers for encouraging patient

participation in the program.<sup>9</sup> The study examined an enhanced reimbursement pilot project from the South Carolina Department of Health and Human Services to BlueChoice Health Plan South Carolina Medicaid, which, in turn, passed the additional incentive payments along to participating prenatal care practices. The study compared a group of 85 pregnant women enrolled in Medicaid who attended at least four Centering Pregnancy sessions with a similar group of expectant mothers who instead saw their doctor individually. The pregnant women participating in the Centering Pregnancy program had a 3.5 percent NICU admission rate, while 12 percent of the matched control group had babies needing NICU care. The lower rate of hospital admissions resulted in an estimated net cost savings of \$67,293 for the Medicaid managed care organization covering the 85 women. These findings are promising as Maryland considers the recommendations for expanded and better coordinated care for mothers and their infants.

In summary, MD Senate Bill 266 explicitly stated that this report was to make recommendations regarding methods to reduce the costs associated with infant mortality. Although it is beyond the scope of this report to conduct a thorough economic analysis, the existing data demonstrate that hospitalization costs associated with conditions such as preterm birth and low birth weight, key risk factors for infant mortality, are consistently higher, and overall costs beyond hospitalization demonstrate the economic and familial consequences of these preventable conditions. There is also growing evidence that prevention of LBW and PTB can directly save families and society in both the immediate period after birth and beyond into childhood. Therefore, in the recommendations section of the report, there is an explicit recommendation on the need for a more extensive economic analysis that can further guide the adoption of recommendations to reduce infant mortality in Maryland.

### References

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## Appendix B: Cost Analysis

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